

IN THE SPECIFICATION

Please replace the paragraph beginning on page 5, line 16, with the following amended paragraph:

In distribution system 100, program streams may be continually transmitted from the head-end to the terminals (i.e., broadcast) or may be addressed to particular terminals that requested the information via an interactive menu (referred to herein as "demand-cast"). An interactive menu structure suitable for requesting video-on-demand (VOD) is disclosed in commonly assigned U.S. Patent Application ~~Serial No. 08/984,427~~ 6,208,335, entitled "METHOD AND APPARATUS FOR PROVIDING A MENU STRUCTURE FOR AN INTERACTIVE INFORMATION DISTRIBUTION SYSTEM," filed ~~December 3, 1997~~ (now U.S. Patent No. 6,208,335, patented March 27, 2001), and incorporated herein by reference. Another example of an interactive menu suitable for requesting multimedia services is an interactive program guide disclosed in commonly assigned U.S. Patent Application ~~Serial No. 09/293,526~~ 6,754,905, entitled "DATA STRUCTURE AND METHODS FOR PROVIDING AN INTERACTIVE PROGRAM GUIDE," filed ~~April 15, 1999~~ (now U.S. Patent 6,754,905, patented June 22, 2004), and incorporated herein by reference.

Please replace the paragraph beginning on page 6, line 19, with the following amended paragraph:

Picture-based encoding is described in detail in U.S. Patent Application ~~Serial No. 09/384,394~~, 6,621,870 entitled "METHOD AND APPARATUS FOR COMPRESSING VIDEO SEQUENCES," filed ~~August 27, 1999~~ (now U.S. Patent No. 6,621,870, patented September 16, 2003). Slice-based encoding is described in detail in U.S. Patent Application ~~Serial No. 09/428,066~~, 6,651,252 entitled "METHOD AND APPARATUS FOR TRANSMITTING VIDEO AND GRAPHICS IN COMPRESSED FORM," filed ~~October 27, 1999~~ (now U.S. Patent No. 6,651,252, patented November 18, 2003). Temporal slice persistence encoding is described in detail in U.S. Patent Application ~~Serial No. (Attorney Docket No. 19880-003410)~~ 6,754,271, entitled "TEMPORAL SLICE PERSISTENCE METHOD AND APPARATUS FOR DELIVERY OF

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INTERACTIVE PROGRAM GUIDE," filed ~~October 10, 2000~~ (now U.S. Patent No. 6,754,271, patented June 22, 2004). StrobeCast encoding and delivery is described in detail in U.S. Patent Application Serial No. 09/687,662, entitled "EFFICIENT DELIVERY OF INTERACTIVE PROGRAM GUIDE USING DEMAND-CAST," filed October 12, 2000. These applications and patents are assigned to the assignee of the invention and incorporated herein by reference.

Please replace the paragraph beginning on page 10, lines 17-20, with the following amended paragraph:

Distribution system 100 is described in further detail in the aforementioned U.S. Patent Application Serial No[s]. 09/687,662 and ~~(Attorney Docket No. 19880-003440)~~ U.S. Patent No. 6,754,271. One specific implementation of head-end 102 is known as the DIVA™ System provided by DIVA Systems Corporation.

Please replace the paragraph beginning on page 12, lines 24-26, with the following amended paragraph:

The mask or reveal feature and the user interaction processing are described in the aforementioned U.S. Patent Application Serial Nos. ~~09/293,526 6,754,905 and 08/984,427 6,208,335~~.

Please replace the paragraph beginning on page 15, lines 9-14, with the following amended paragraph:

If a viewer wants to view the guide data for a particular group of channels (i.e., a particular IPG page), a demultiplexer at the terminal selects the I-PID for the selected IPG page and recombines the selected I-PID with the base-PID to produce a recombined stream, which is then decoded by the video decoder. Picture-level recombination is described in further detail in the aforementioned U.S. Patent Application Serial No. ~~(Attorney Docket No. 19880-003440)~~ 6,754,271.

Please replace the paragraph beginning on page 15, lines 15-21, with the following amended paragraph:

FIG. 3B depicts an embodiment of a data structure 320 that may be used in conjunction with slice-based encoding. In this example, ten IPG pages are available, with each page represented by a respective guide portion (g) and a common video portion (v). For example, IPG page 1 is represented as (g₁/v₁), IPG page 2 is represented as (g₂/v₁), and so on. In data structure 320, ten guide portions g₁ through g₁₀ are associated with the video portion (v₁). Slice-based encoding is described in the aforementioned U.S. Patent Application Serial No[s]. ~~(Attorney Docket No. 19880-003410)~~ and 09/635,508 and U.S. Patent No. 6,754,271.

Please replace the paragraph beginning on page 15, lines 22-32, with the following amended paragraph:

As shown in FIG. 3B, the coded slices for the guide and video portions of the IPG pages can be assigned to a number of PIDs. In FIG. 3B, only the contents that is assigned a PID is delivered to the terminals. The intra-coded guide portions g₁ through g₁₀ are assigned to PID 1 through PID 10, respectively. One of the common intra-coded video portion v₁ (e.g., for IPG page 10) is assigned to PID 11. In this form, substantial bandwidth saving is achieved by delivering the intra-coded video portion v₁ only once. Finally, the predictive-coded pictures g₁/v₂ through g₁/v₁₅ are assigned to PID 12. Again, a substantial saving in bandwidth is achieved by transmitting only one group of fourteen predictive-coded pictures, g₁/v₂ through g₁/v₁₅. The PID assignment and decoding processes are described in the aforementioned U.S. Patent Application Serial No. ~~(Attorney Docket No. 19880-003410)~~ 6,754,271.

Please replace the paragraph beginning on page 16, lines 16-23, with the following amended paragraph:

The presentation times of the guide frames and motion video frames are assigned in accordance with a "temporal slice persistence" fact. In an embodiment (not represented in FIG. 3C), the guide PIDs (i.e., G-PID 1, G-PID 2, and so on) are time stamped to be presented at the end of each GOP at t=15. At t=15, the last motion video

frame in the GOP is dropped and the viewer-selected guide page is presented. To achieve this, the video decoder re-combines the selected guide G-PID (e.g., G-PID 1) and the video V-PID via one of the picture-based recombination methods described in the aforementioned U.S. Patent Application Serial No. (~~Attorney Docket No. 19880-003410~~) 6,754,271.

Please replace the paragraph beginning on page 16, line 31 to page 17, line 4 with the following amended paragraph:

The embodiments disclosed with respect to FIG. 3C can be used for broadcast of IPG pages and can further be used for a demand-cast of IPG pages in response to viewer requests. For demand-cast, the head-end can time stamp the requested page to be processed and quickly displayed on the screen in a suitable time index within a GOP to reduce delays. The guide frames and motion video frames can be encoded, delivered, decoded, and displayed in various manners, as described in the aforementioned U.S. Patent Application Serial No. (~~Attorney Docket No. 19880-003410~~) 6,754,271.

Please replace the paragraph beginning on page 17, lines 5-14, with the following amended paragraph:

In another embodiment that is supported by FIG. 3C, the V-PID is encoded to include P and B pictures (e.g., a GOP of I-B-B-P-B-B-P-B-B-P-B-B), and any B picture in the V-PID can be dropped and replaced with a B-coded guide frame that includes "intra-coded" macroblocks. This can be achieved by adjusting the encoding threshold selection that decides whether a macroblock is better to be encoded as intra-coded or as predictive-coded. Any B-coded frame can be dropped and replaced since it is not used as a reference for prediction by any other pictures in a GOP. The guide page frames can be time stamped to be presented, for example, at $t=2$. Other embodiments for encoding and decoding the guide frames are described in the aforementioned U.S. Patent Application Serial No. (~~Attorney Docket No. 19880-003410~~) 6,754,271.

Please replace the paragraph beginning on page 17, lines 23-32, with the following amended paragraph:

The temporal slice persistence technique can be advantageously employed in a broadcast scenario whereby a large number of guide PIDs (in the order of hundreds) can be efficiently delivered. Since the guide PIDs do not carry full motion barker video, huge bandwidth savings can be achieved. The barker video can be sent as a separate video stream (e.g., V-PID or another PID). The temporal slice persistence technique can also be used to implement other combinations of coding and decoding of guide frames, full motion video frames, and (possibly) other multimedia information in a GOP. The temporal slice persistence technique employs picture-based recombination techniques with slice-based sub-picture updating mechanisms, as described in the aforementioned U.S. Patent Application Serial No. ~~(Attorney Docket No. 19880-003410)~~ 6,754,271.

Please replace the paragraph beginning on page 21, lines 11-20, with the following amended paragraph:

Stream processing routine 568 coordinates the recombination of video streams to form the desired video sequences. Stream processing routine 3468 employs a variety of methods to recombine slice-based streams, some of which are described in the aforementioned U.S. Patent Application Serial No. ~~(Attorney Docket No. 19880-003410)~~ 6,754,271. In one recombination method, a PID filter 516 within demodulator 514 is utilized to filter the undesired PIDs and retrieve the desired PIDs from the transport stream. The packets to be extracted and decoded to form a particular IPG page are identified by PID mapping table 564. For most recombination methods, after stream processing routine 568 has processed the streams into the proper order, the slices are sent to video decoder 530 (e.g., an MPEG-2 decoder) to form uncompressed IPG pages suitable for display.

Please replace the paragraph beginning on page 22, lines 19-29, with the following amended paragraph:

IPG application 622 is responsible for providing IPG service to a viewer at terminal 608. This may be achieved via an IPG user interface, an implementation of which is described above and in the aforementioned U.S. Patent Application Serial Nos. ~~08/984,427~~ 6,208,355 and ~~09/293,526~~ 6,754,905. IPG application 622 allows a viewer to browse through a number of guide pages for programming for a number of broadcast channels. The viewer is further able to view guide listings for a particular type of channels or programming (e.g., Movies, Kids, Sports, and so on) or for the viewer's defined set of channels (e.g., Favorites). In an embodiment, the viewer is also able to launch (i.e., activate) VOD application 624 from IPG application 622. This activation of the VOD user interface may be achieved, for example, (1) by selecting a VOD icon provided in the IPG menu, (2) by pressing a particular key on a remote control unit, or (3) via some other mechanism.

Please replace the paragraph beginning on page 22, line 30 to page 23, line 6, with the following amended paragraph:

VOD application 624 is responsible for providing VOD service to the viewer. This may be achieved via a VOD user interface, an implementation of which is described in the aforementioned U.S. Patent Application Serial No. ~~08/984,427~~ 6,208,335. In an embodiment, VOD application 624 provides VOD service requests and VCR stream control requests to VOD server 614. The requests may be sent from terminal 608 to VOD head-end 604 via, for example, an upstream path of an out-of-band network and using a particular protocol such as, for example, UDP over IP. The responses from VOD head-end 604 (possibly excluding the video and bitmap data) may be sent to terminal 608 via, for example, a downstream path of the out-of-band network. Video and bitmap data may be sent to terminal 608 via, for example, an in-band network.

Please replace the paragraph beginning on page 23, line 22 to page 24 line 2, with the following amended paragraph:

In one embodiment, only one higher layer application (e.g., either the IPG or VOD application) is active at any given moment and responsible for providing the basic interface with the viewer. The other application(s) are dormant until launched by the active application. In another embodiment, multiple higher layer applications may be active (or semi-active) concurrently. In this embodiment, where both applications may be active or semi-active, the applications may be designed with the capability to overlay a part of the IPG user interface and/or a spotlight window on top of a VOD user interface, and/or to overlay a part of the VOD user interface on top of the IPG user interface. Any sub-region of the IPG may be overlayed on top of the VOD user interface using, for example, slice-based encoding methods described in the aforementioned U.S. Patent ~~Application Serial No. (Attorney Docket No. 19880-003410)~~ 6,754,271. Main IPG user interface modules, such as a spotlight window, may also be overlayed on top of VOD user interface based on any of the encoding and delivery techniques described in the aforementioned U.S. Patent Application Serial No. 09/691,495.